quite essential in these cases, and formed into the following combinations:

Platinum. Zinc.
Peroxide of lead.
Platinum. Lead.
Peroxide of lead.-
Platinum. Cadmium.
Peroxide of lead.
Platinum. Iron.
Peroxide of lead.

Of these varied combinations, not one gave the least signs of a current, provided differences of temperature were excluded; though in every case the circle formed was, as to conducting power, perfect for the purpose, *i.e.* able to conduct even a very weak thermo current.

858. In the contact theory it is not therefore the metals alone that must be assumed to have their contact forces so balanced as to produce, in any circle of them, an effect amounting to nothing (797); but all solid bodies that are able to conduct, whether they be forms of carbon, or oxides, or sulphurets, must be included in the same category. So also must the electrolytes already referred to, namely, the solutions of sulphuret of potassium and potash, and nitrous and nitric acids, in every case where they do not act chemically. In fact *all conductors* that do'not act chemically in the circuit must be assumed, by the contact theory, to be in this condition, until a case of voltaic current without chemical action is produced (846).

859. Then, even admitting that the results obtained by Volta and his followers with the electrometer prove that mere contact has an electromotive force and can produce an effect, surely all experience with contact alone goes to show that the electromotive forces in a circuit are always balanced. How else is it likely that the above-named most varied substances should be found to agree in this respect? unless indeed it be, as I believe, that all substances agree in this, of having no such power at all. If so, then where is the source of power which can account by the theory of contact for the current in the voltaic pile? If they are not balanced, then where is the sufficient case of contact alone producing a current? or where are the numerical data which indicate that such a case can be (796, 856)? The

contact philosophers are bound to produce, not a case where the current is infmitesimally small, for such cannot account for the current of the voltaic pile, and will always come within the debatable ground which De la Rive has so well defended, but a case and data of such distinctness and importance as may be